

# Crop yield and weed suppression in three different vegetable management systems in Central Italy

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## • Aim of the study

To compare a conventional (CS), an integrated (IS) and an organic (OS) management systems within the same vegetable crop rotation (lettuce, spinach, carrot, cauliflower). In this preliminary analysis we focus on the agronomic (yield and weed management), operative (machine performances and labour time) and economic aspects of the first two crops.

## • Materials & Methods

The trial started in 2009 at the CIRAA "Enrico Avanzi" (University of Pisa, Italy) and is still on-going. The experimental design is a RCB (Randomized Complete Block) with 3 replications. Plot size is 50 x 1.5 m.

The three management systems are characterized by different initial soil disinfection treatments, different weed control and different fertilization strategies.

Steaming was performed with the self-propelled machine Celli Ecostar SC 600 and the subsequent physical treatments were carried out with a precision hoe equipped with rigid elements and elastic tines for intra-row and in-row weed control, respectively.

### CS

- ▶ Soil steaming (pure steam);
- ▶ Post-emergence chemical weed control: 1600 g ha<sup>-1</sup> of propyzamide for lettuce; 960 g ha<sup>-1</sup> phenmedipham+69 g ha<sup>-1</sup> fenoxaprop-P-ethyl for spinach;
- ▶ Mechanical weed control when necessary;
- ▶ Mineral fertilization

### IS

- ▶ Soil steaming (steam + 4000 kg ha<sup>-1</sup> CaO);
- ▶ Physical weed control;
- ▶ Mineral-organic fertilization



### OS

- ▶ Biofumigation: 3000 kg ha<sup>-1</sup> Biofence® (*Brassica juncea* L. meal);
- ▶ Physical weed control;
- ▶ Organic fertilization



## • Results

In case of lettuce, precision hoeing performed before harvest reduced to zero weed biomass in all the systems. Crop yield was significantly higher in IS than CS, whilst no differences were found with respect to OS.

In spinach we observed a lower weed biomass at harvest and a higher marketable fresh yield under IS and OS than in CS.

IS and OS were more expensive than CS only as a consequence of the major labour demand due to hoeing and hand weeding, whilst soil disinfection costs almost the same.

	LETTUCE		SPINACH		TOTAL
	Marketable Fresh Yield (t ha <sup>-1</sup> )	Weed Dry Matter (t ha <sup>-1</sup> )	Marketable Fresh Yield (t ha <sup>-1</sup> )	Weed Dry Matter (t ha <sup>-1</sup> )	Crop production costs (€ ha <sup>-1</sup> )
CS	9.69 b	0.00	3.40 b	0.08 a	4,998
IS	15.88 a	0.00	4.94 a	0.01 b	6,872
OS	13.37 ab	0.00	4.83 a	0.01 b	6,565
Significance	*	-	**	*	-
LSD	4.59	-	0.47	0.06	-

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